# Navy ILE Instructional Systems Design and Instructional Design Process



**Integrated Learning Environment**

**1 February 2006**

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## Acronyms, Abbreviations, Definitions

| | |
|---|---|
| CDRL | Contract Deliverable Requirements List |
| CNO | Chief of Naval Operations |
| EIII | Echelon III |
| EIIIs | Echelon III Commands |
| GFE | Government Furnished Equipment |
| GFI | Government Furnished Information |
| HPI | Human Performance Improvement |
| HPSM | Human Performance Systems Model |
| ID | Instructional Design |
| IIM | ILE ISD/ID Model |
| IIM | ISD/ID Model |
| ILE | Integrated Learning Environment |
| ISD | Instructional Systems Design |
| JTA | Job Task Analysis |
| LOS | Learning Objective Statements |
| NETC | Naval Education and Training Command |
| PM | Program Manager |
| QA | Quality Assurance |
| RiT | Revolution in Training |
| ROI | Return on Investment |
| SCORM | Sharable Content Object Reference Model |

See the ILE website for a complete list of acronyms, abbreviations and definitions.

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# 1.    Purpose

The purpose of this document is to provide high level guidance on the instructional design process in support of the ILE.

> **MISSION: The Integrated Learning Environment (ILE)** transformation strategy and architecture bring together the program management, functional, and technical integration of processes, products, and people involved in capturing, organizing, designing, validating, and deploying instructional and technical content to the users in the right format and place at the time of need.

Instructional Systems Design.  A system is defined as a set of components that work together for the overall objective of the whole.  The parent entity (ILE) is the whole, with its fit and relationship to its operational environment and mission as primary concerns; the parts (i.e., commands or training sites within the naval education and training sphere) are secondary.  The process that governs the interactions of the individual entities within the ILE system is the ISD process.

> **Instructional Systems Design** is the process that governs how independent entities within a larger organization will operate as a single, cohesive unit.  In the simplest of terms, ISD (reading the acronym from right to left instead of left to right) is the process used to *design systems* (people and technology) that are responsible for the *instructional elements* of a larger organization.

The approach outlined in the ISD/ID Processes document is grounded in two major constructs:

- Systems Thinking
- Quality

Systems Thinking.  The first construct comes from Systems Thinking and is based on three fundamental principles (Haines, 1998):
- Openness: A system that accepts inputs from its environment, acts on the inputs to create outputs, and releases the outputs to its environment.
- Interrelationship: The workings or changes on one component within a system that cause a change or impact a change in another component or components
- Interdependence: The health or working efficiency of one component is dependent upon the working efficiency of another component or components.

Systems thinking views organizational problems as systems problems and seeks systems-integrated solutions.  The ILE Implementation team (See Encl 1) identifies and solves problems by detecting patterns of relationships and interdependence and looks for leverage points that can lead to beneficial changes throughout the integrated systems of naval education and training.

The world of systems thinking is a circular entity of feedback loops, not a linear process with a finite end.  The model is input ➔ transformation ➔ output ➔ feedback.

Quality. The second major construct is the orchestrated commitment to quality.  The adoption of a quality-management system is a strategic decision that is implemented throughout the entire system.  Day-to-day operations, processes, and people are guided by a loyalty to the organization and to producing "quality products."   The Naval Education and Training Command (NETC) learning organization can neither produce nor accept anything less for its Sailors.

The approach of linking the two constructs – Systems Thinking and Quality – is introduced in the American National Standard:  Quality Assurance for Application of ANSI/ISO/ASQC Q9001 or Q9002 to Education and Training Institutions.

By adopting systems thinking and quality, NETC can provide to all those engaged in managing, producing, and delivering learning the processes, tools, and measures to ensure curriculum meets training needs.  However, while curriculum specifies what is to be learned and how it is to be assessed, curriculum does not include a provision for quality control of the internal processes.

This document provides guidelines for a comprehensive design and development process and provides configuration management guidelines for ongoing support of ILE Program designed products. This process applies to all ILE Echelon III Commands (EIIIs).  This document is not intended to be a recipe for the design effort described herein, rather it identifies key elements and additional resource documents that may be used, as appropriate, in order to move management decisions to the lowest level possible without negatively impacting or degrading the ILE System.  In all cases, both the design team and the customer must agree upon and execute a specific approach for each design project.

Command Review.  Internal quality control and audits will ensure a continued assessment of not only the curriculum, but also of the supporting organizational systems and processes.  Each component (i.e., training commands, schools, systems) within the ILE will have fair benchmarks that have been clearly defined and articulated.  Additionally, the benchmarks will be measurable.  The NETC Command Review team will conduct periodic reviews at all levels to collect data and lessons learned, and to identify areas for process improvement.

## 2.    Policy

Instructional Systems Design process grounded in systems thinking and a commitment to quality serves as the operational tenet for all components conducting business within the ILE.  The purpose of adopting this approach is to place decision-making at the most appropriate level within the organization.

- The ILE Program Management Team will make decisions that impact the entire learning environment, its interrelationships, and interdependency.
- The ILE ISD/ID Processes document will provide guidance for the EIIIs to determine the level of responsibility and decision-control parameters within their respective command and their subcomponents.  Each process will be outlined and defined with a procedure and the required documentation.
- EIIIs will adapt the processes outlined in the ISD/ID guidance to their specific organizational mission and requirements.  Further, EIIIs will maintain documentation to support the adaptations made.  Internal audits provided by the NETC Command Review program will verify that the adaptations, procedures, and documentation align with the ILE guidance. See        Figure 1, Decision-making Authority and Parameters.
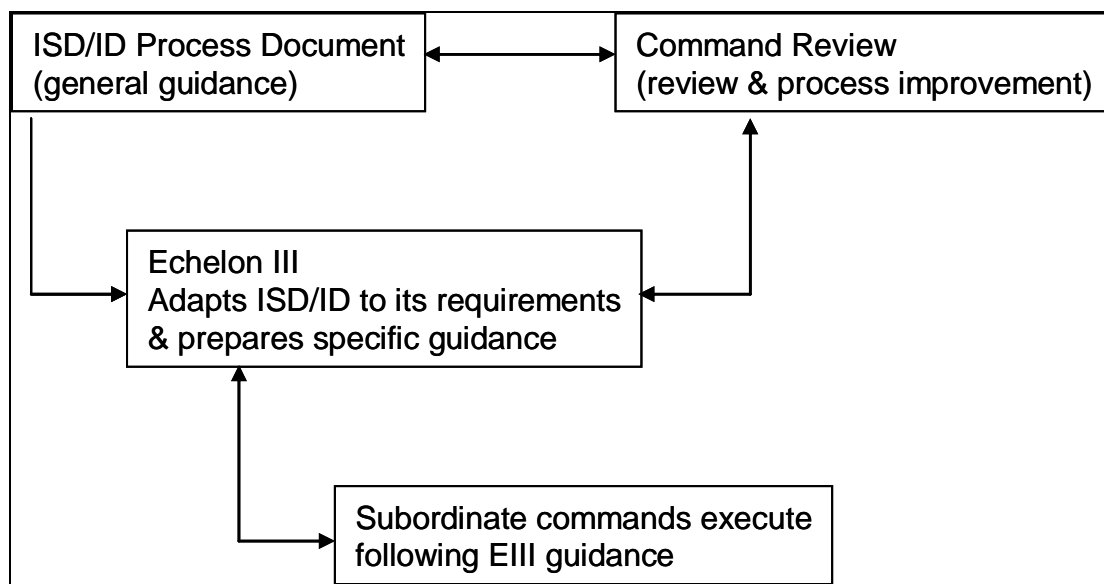


**Figure 1      Decision-making Authority and Parameters**

The goal is to move management decisions to the lowest level possible.  Level 1 decisions affect the ILE system and are made at the ILE Implementation Team or Headquarters level.  They are non-negotiable and systems operational.  Changes to these processes must be carefully considered so as not to negatively impact or degrade the ILE System.  Level 2 decisions are made by the EIII.  EIIIs have the authority to interpret and execute the design and development process within their command.

The Instructional Design process outlined in this document is used to design, develop, implement, and maintain content within the ILE.  It is the responsibility of each of the EIIIs to adapt this guidance to meet the needs of its subordinate commands.

Content placed within the ILE is the property of the government and it is the government's responsibility to ensure initial requirements have been properly defined (i.e., project scope) are being performed, and that ongoing measurement and evaluation takes place to provide feedback and indicators as to how well performance goals are being met.

The ILE, Content Lead, is the claimancy's process owner for this document.

# 3.    Action

The implementation of this guidance is the responsibility of the NETC Echelon III Component Commands. All EIIIs will ensure new content designed and developed for the ILE meets the specifications identified in this document as well as other ILE documents.

When legacy content is repurposed, the content must be rewritten to reflect the new specifications.  As EIIIs meet with the ILE Content Lead to develop course/content prioritization lists, the new specifications should be written into the statements of work.

Implementation and evaluation of developed ILE content will be conducted at the EIII level. EIIIs will be given the latitude to delegate analysis, implementation, and evaluation activities of ILE content to subordinate commands and contracted parties. The EIIIs responsible for training and education content development are responsible for that content's quality and timely delivery.

In the event that content to support training requirements cannot be sufficiently designed and developed in accordance with this guidance, the EIII representative should contact the ILE Content Lead.

# 4.    Background

The Navy's human capital strategy, "Sea Warrior," is one component of the Navy's modernization agenda.  The Revolution in Training (RiT) has brought about a sweeping change in the way the Navy views the delivery and focus of its learning programs to ensure current and future readiness by delivering executable capabilities in a fiscally responsible manner.

As part of Sea Power 21 and Sea Warrior, the Chief of Naval Operations (CNO) initiated the RiT to revamp the Navy's organization, methods, and information technologies, and to create an entirely new way of training and educating Sailors.  The ultimate goal of the RiT is to transform the Navy's education and training commands into a single, agile and efficient operation, housed within a responsive learning environment.  This new organization will provide a richness and depth of opportunity to develop, support, and credential the professional and personal education of Sailors so they can succeed in their careers and in life.

To achieve this goal, the RIT has three guiding principles:

1. Develop a systematic approach to education and training that uses precepts and methods based on the science of learning, with human performance as the guiding metric of success.
2. Develop a continuum of learning to support Sailors throughout their lives, whether active duty or retired.
3. Support Fleet mission areas by matching a Sailor's education, training, and job assignments to the skills needed by Fleet missions and the Sailor's desires for career development.

To meet the functionality and capacity implied by these principles, the Navy uses the ILE to align development and delivery of learning events to Fleet mission and job requirements.  The ILE strategy brings together the program management, functional, and technical integration of processes, products, and people involved in capturing, organizing, designing, validating, and deploying instructional and technical content to the users in the right format and place at the time of need.

As stated in the ILE Functional Requirements Document,

*Content is the most critical component of the ILE. The "right content" is tied to readiness, validated by meeting mission requirements, and is directly linked to authoritative sources.  Critical to content is the need to have processes in place to ensure updates are quickly realized across the entire system from source material to learning content, as needed.*

Job Task Analysis (JTA) provides the framework for the ILE to define job/position requirements for position skills, unique knowledge, tools, resources, skills and abilities. Using JTA data to develop learning objective statements (LOS) establishes content linkage with the full spectrum of work proficiency required for mission readiness and professional expertise.

The SkillObject Framework for JTA datat provides work, worker, and workplace descriptors.  Figure 2 illustrates the SkillObject framework and composite relationships.
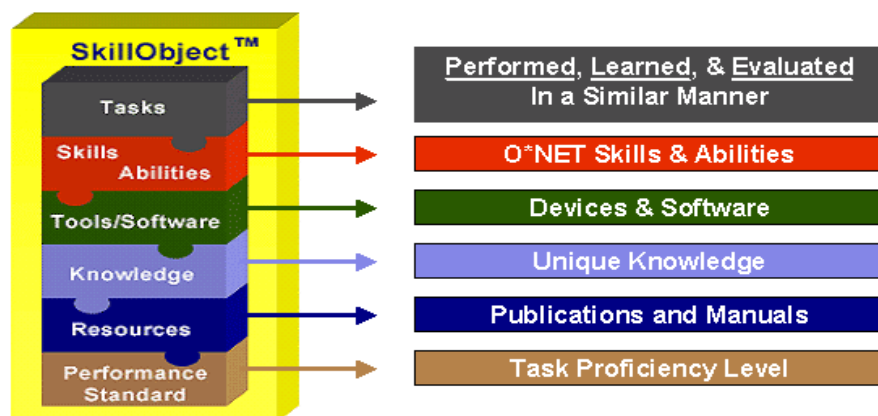


**Figure 2  SkillObject<sup>TM</sup> Composition**

Utilization of JTA data provides the fundamental unit for content development which aligns mission-driven, work-based requirements to prescriptive learning solutions.

# 5.    Research-Based

The guidance provided by this document is based on current instructional systems design principles and instructional design research and practice. The Science of Learning, Human Performance Theory, and Navy's Human Capital Strategy are also used to provide research-oriented guiding principles. To expedite the design and development of content, the ILE Content team has elected to begin with a widely used taxonomy developed by Bloom, Englehart, Furst, Hill, & Krathwohl (1956), with additional input from other noted researchers (Gronlund, 1985, 1995; Dick, Carey, & Carey, 2001; Heinich, Molenda, & Russell, 1993; Kibler, 1981; Krathwohl, Bloom, & Masia, 1964; Mager, 1984; Morrison, Ross, & Kemp 2004; Rothwell & Kazanas, 2004; and Smith & Ragan, 1999).

# 6.    Assumptions

Utilization of the Instructional Systems Design Model combined with the Human Performance Systems Model (HPSM) assumes a sound basis for analysis of learning requirements, development of appropriate solutions, implementation of best practices, and formative and summative evaluation strategies. Other assumptions include availability of and access to professional expertise and skill sets, utilization of synchronous and asynchronous collaborative learning methodologies, integration with subject matter experts, and incorporation of standardized content review procedures for analysis, design, development, implementation, and evaluation of learning requirements and learning solutions.

# 7.    Human Performance Technology

Human Performance Technology is a systematic method for finding cost-effective ways to help people perform their jobs better.  It is a discipline that applies systems thinking with the goal of aligning and improving organization performance.  It examines the whole organization and its environment (including human factors), not just individual jobs and tasks.  It focuses both on the systems within an organization and on the individuals who provide input to those systems.  It does not focus solely on training or knowledge/skills-related issues.  This systematic method involves a 4-step process, which includes:

1.  Examine whether things are working as they should.
2.  If they are not, determine why.
3.  Decide what to do in order to make them work as they should.
4.  After implementation, measure and evaluate the effectiveness of the chosen solution.

The Executive Review of Naval Training (ERNT, 2001) identified the 4-Quadrant Human Performance Systems Model, see Figure 3, as the process structure for implementation of a performance-based systems capability. This cyclical model defines organization and individual performance requirements, establishes how best to achieve this performance, develops the necessary tools or products to enable it, implements the solution set, and provides feedback based on an evaluation of the outcomes.  By following this systematic

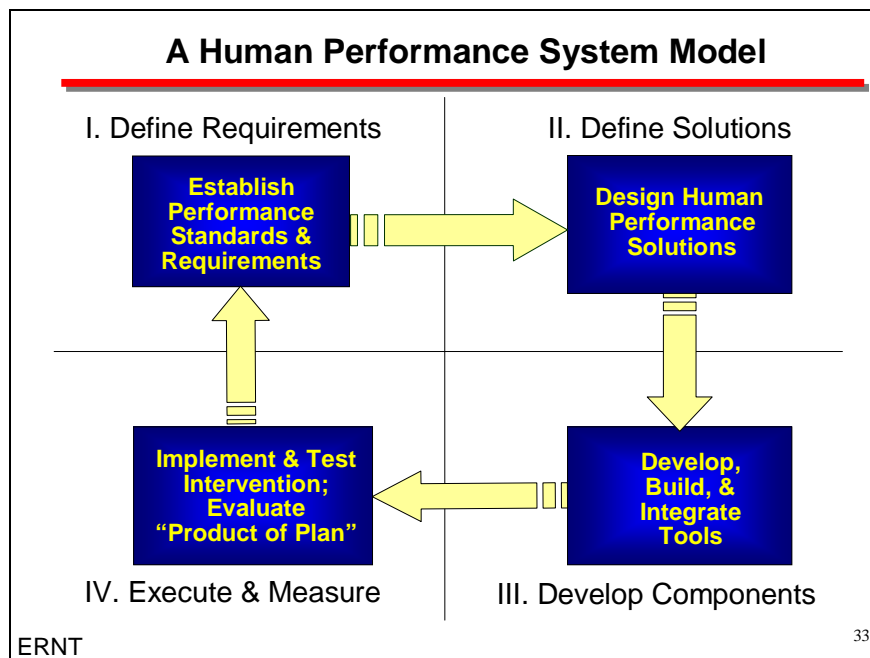iterative process the Navy can function while continually learning, adapting, and rejuvenating itself.



**Figure 3      Human Performance System Model**

# 8.    Human Performance Improvement Process

The Human Performance Improvement (HPI) process model, see Figure 4, is the Human Performance Center's recommended approach to applying the practice of human performance technology.   It is a results-based, systematic approach to identifying, assessing, and resolving performance issues within the framework of the organization as a system.

Because the HPI process focuses improvement efforts on the organization and focuses on accomplishments rather than behaviors, the Navy must shift away from the tendency to think only within the training realm, and must begin to think of starting at the top (organization level) rather than at the bottom (individual Sailor) when applying performance improvement methodologies.

The HPSM is a simple graphic that unintentionally hides what is a complex set of processes with many layers of interpretation. The HPI serves as a more thorough guide to the steps for improving performance. See Encl 2 for a breakdown of the relationship of the four quadrants of the HPSM with the HPI.

Following the HPI process, one eventually comes to Quadrant III, Develop Components, granted that not all problems may be solved with training.  However, the remainder of this document deals with the design and development of content as a learning intervention or training solution.
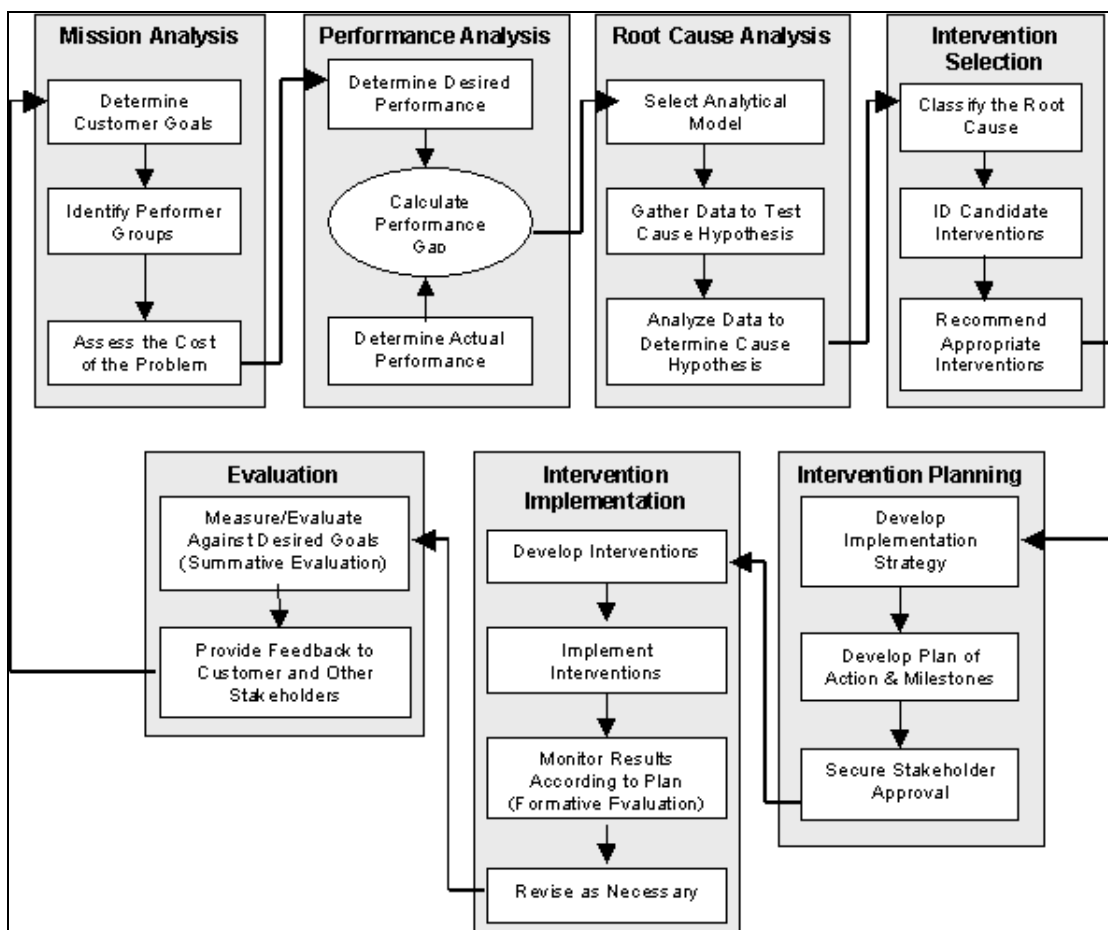
**Figure 4          Human Performance Improvement Process**

The ILE ISD/ID Model (IIM) supports the Navy human capital strategy by specifying a standard content development process based on the Science of Learning and its underlying disciplines. Science of Learning draws from research on human development, learning and transfer, cognitive psychology, social psychology, anthropology, and neuroscience (Bransford, et al, 2000). Content developed based on the IIM supports the Navy's overarching goal to deliver the skill sets necessary to prepare Sailors to go on to team training. To support the Navy's goal to modernize its professional education, the ILE will house IIM-based content that will allow implementation of learning solutions that include modalities of e-learning, coaching sessions, simulations, and blended learning solutions in addition to the traditional classroom-based method.

# 9.    Instructional Design Process

The creation and management of content follows five basic steps: analysis, design, development, implement, and evaluation. This generalized framework of the instructional design process is called ADDIE, an acronym created from the names of each phase. In practice, these events may be performed sequentially, may be skipped, iteration among events may be required, or a different sequence may need to be used. Various factors affect the sequence or scope of events such as service needs, scope, or complexity of the design project, as well as other factors. Events to be applied and their sequence

should be documented in the project management plan. Although ADDIE provides a general process, there are a number of ISD methodologies and models that may be used in the design of learning materials.

The ILE strategy identified in this document integrates the ADDIE model with the HPSM 4-Quadrant Model (Define Requirements, Define Solutions, Develop Components, Execute and Measure) in order to align learning requirements and learning solutions with measureable, performance-based learning objectives. Figure 5 illustrates the relationship between the ISD Model and the HPSM Model.
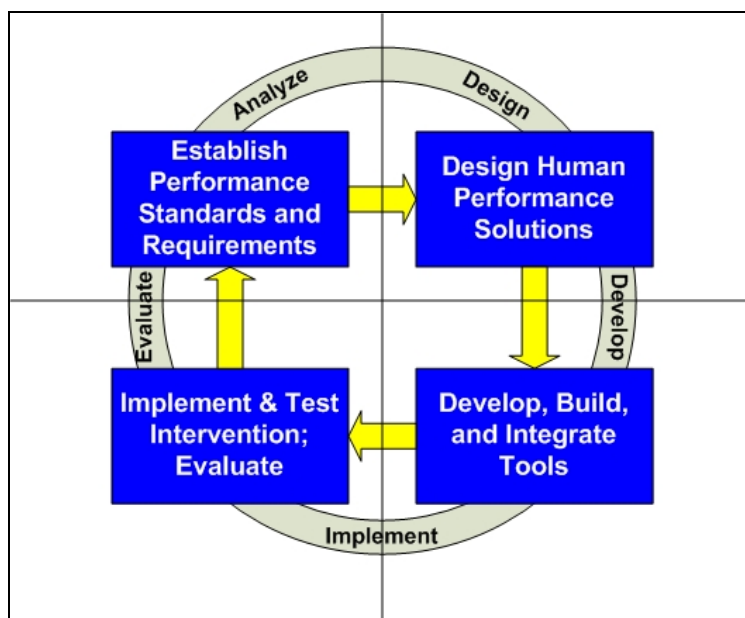


**Figure 5      ISD Model and the HPSM Model**

The ILE Content Team has elected to integrate Instructional Systems Model process steps with the Human Performance Systems Model. Process Maps and accompanying component identification/clarification are provided for each HPSM Quadrant/ISD construct in order to establish a standardized procedural framework for prescriptive content development and evaluation of learning interventions.

This document serves as the baseline needed at the present time to guide the linkage between JTA data, work-related elements, learning events, learning objectives, and content.

- What triggers a learning intervention?
- Is there a mission/job/equipment/personal performance issue?
- Do we begin with "raw material" and seek to instill knowledge, skills, and abilities required for identified job performance?
- Does the learner need to progress from one level of proficiency to a higher level of proficiency?
- Is there a requirement for transition from one job to another, related (or unrelated) job? Does a mission require a unique skill set? Does new equipment/technology deployment generate a skill set requirement?

## 9.1.   Analysis

Any and all of these triggers serve as a learning or training requirement, which is the **INPUT** to the instructional analysis process. Given a learning/training requirement, the following process steps/accompanying resources are followed/applied:

1. Identify the required level of proficiency for the skill set required.
2. Identify the critical tasks, knowledge, skills, tools, and resources (based upon importance, consequence of error, and frequency data).
3. Group tasks using the JTA data.
4. Prioritize core tasks, subtasks, and procedures.
5. Identify the training characteristics (e.g. how long it takes to learn, coordination/teaming requirements, chain of command, likely performance errors and remediation strategies).
6. Identify the training conditions (e.g. use case/context, may include platform, environmental, battle, time pressure, stress level, changing equipment/tools).
7. Identify the training gaps.
8. Identify the desired outcomes (cognitive, affective, psychomotor, verbal, social) for each core task, core subtask, or procedure.
9. Identify a learning objective statement verb.
10. Identify criterion for acceptable performance (quality, quantify, speed).
11. Generate the learning objective statement (the OUTPUT from the Learning Analysis Process).

For more information on composing learning objectives, review the <u>Learning Objective Statement Guidance</u> document.

Table 1 captures the Analysis Team Requirements, and Figure 6 represents the Analysis Process Flow.

**Table 1          Analysis Team Requirements**

| Team Member | Role |
|---|---|
| Training/Education SMES | Content Owners |
| Instructional Designers | Learning Objective Development |
| Skills Analysts | SkillObject Data Analytics & Alignment |
| Human Performance Technologist | Performance analysis |
| Science of Learning Practioner | Performance-based learning assessment |
| Human Systems Integration Specialist (as needed) | Human Factors analysis |
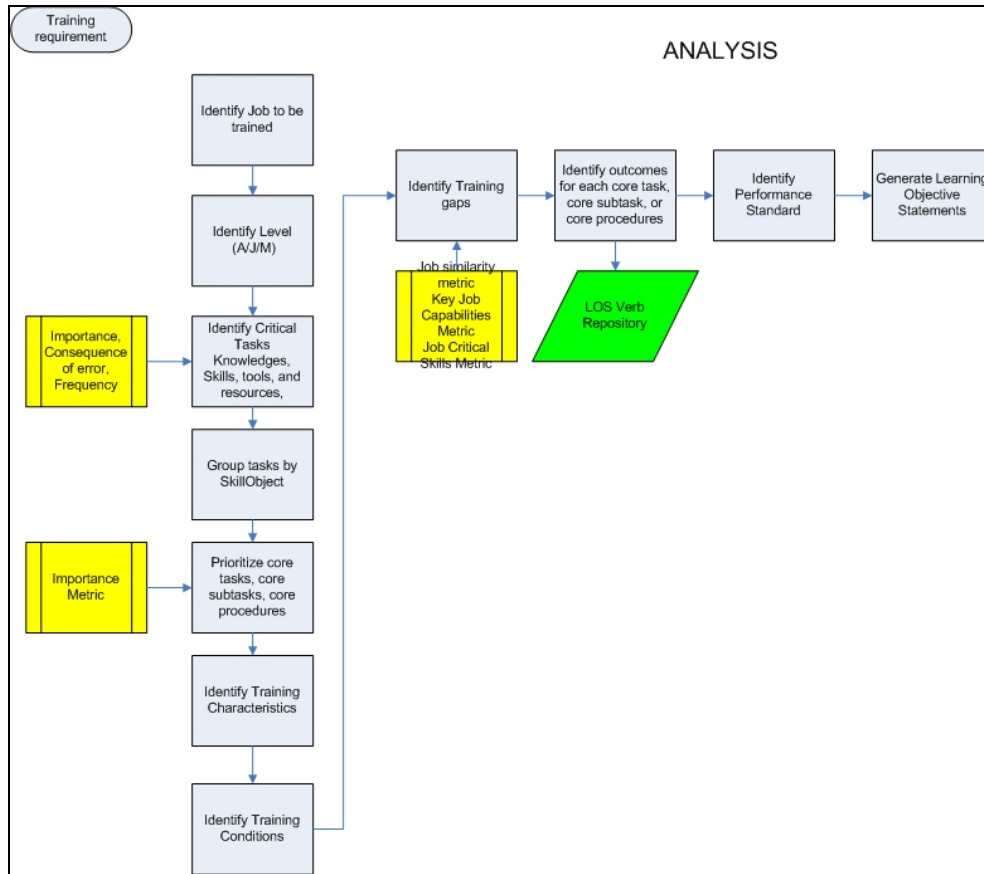
**Figure 6          Analysis Process Flow**

## 9.2.   Design

The design phase occurs after an analysis of the training requirements have been performed and ends when a proof of concept prototype is designed and the Navy has tested and accepted the design for the content.

EIIIs have the authority to interpret and execute the design process within their command.

Table 2 identifies who has implementation responsibility during the design process.

**Table 2          Design Process Implementation Responsibility**

| Block | Level |
|---|---|
| Policy and Guidance | Level 1 |
| Produce the Design Documents | Level 2 |
| Design Capability Solution | Level 2 |
| Review the Design Documents | Level 2 |
| Corrections: Document Constructive Feedback or Acceptance | Level 2 |
| Command Review | Level 1 |

The Government Program Manager, hereafter known as the PM, has overall responsibility for managing the design process. Design plans influence the process for a

specific project; however, responsibilities and activities needed to define technical requirements, documentation, and all necessary review and verification/validation activities also need to be defined.  Design changes are identified, documented, reviewed, and approved by authorized personnel before their implementation and configuration control is carried out and maintained.  The PM reviews all data related to the planning process, initiates appropriate corrective/preventive action*,* and provides trend data and related recommendations to ILE Implementation Team/Headquarters for review and action.

After analysis, should the decision be made to proceed with design, the following steps will provide the necessary inputs to development.

1. Review analysis output.
2. Produce design documents
3. Send the solution onto the development team.

Before the design process can begin, the following questions must be addressed:

1. Has an analysis been conducted?
2. Is adequate mission information available?
3. What are the human performance attributes?
4. Does a business case exist?

If the answer to any of these questions is negative, then they must be addressed before design can commence.

## 9.2.1. Policy and Guidance

MIL-PRF-29612B establishes data requirements to support the life-cycle maintenance of training data products.

For more information on the performance specification for training data products, go to http://dtswg.fedsun.navy.mil/.

## 9.2.2. Review Analysis Outputs

While reviewing analysis outputs, instructional designers will learn as much as they can about the learners, about the environment in which the learners will be trained, and about the tasks for which the learners must be prepared. Much of this information will be found in the documents developed during the analysis phase.

## 9.2.3. Produce Design Documents

During the design phase, the following training data products listed in the table are produced, tailored to the requirements of the project and Contract Deliverable Requirements Lists (CDRLs).

**Table 3          Design Documents**

| TRAINING DATA PRODUCTS | Description | Identifier |
|---|---|---|
| Instructional Media Design Package | This training data product shall provide baseline requirements data necessary for the development and production of courseware. | **DI-SESS-81520B** Instructional Media Design Package (31 August 2001) |
| Instructional Media Package | This training data product shall provide specific data necessary to support the transfer of knowledge, skills, and attitudes by use of instructional media. | **DI-SESS-81526B** Instructional Media Package (31 August 2001) |
| Training Conduct Support Document | This training data product shall provide definition and direction for instructors and trainees for the conduct of formal training. This product also supports the trainee's mastery of knowledge, skills, and attitudes for a given subject. | **DI-SESS-81523B** Training Conduct Support Document (31 August 2001) |

A prototype of lesson content is developed for Navy review. The development team will forwards the prototype to the PM as a proof of concept test to ensure it meets technical specifications, performance requirements, and operates in the ILE.

This prototype should be tested using the Sharable Content Object Reference Model (SCORM) testing suite to validate compatibility with the SCORM standards.

The SCORM testing suite can be found on the SCORM website at http://www.adlnet.org.

### 9.2.4. Review Design Documents

The design phase ends with a review of the design documents and prototype lesson. This review is performed by the IPT/HPC team. Corrections are made to the impacted documents and prototype lesson. Finally the Echelon III command reviews the content and returns for corrections or signs off.

### 9.2.5. Design Capability Solution

The capability solution is a document that specifies requirements from other ILE functional areas (i.e., logistics, engineering, scheduling, etc.) to identify, early on, the impact on efforts within other ILE components.

The following steps are employed to design the capability solution:

- Compile all design documents.
- Develop the Design Capability Solution Report.
- Deliver the Design Capability Solution Report.
- Disseminate the design capability solution to the appropriate ILE components (i.e., Architecture and Delivery Systems IPT, Risk Management IPT, Scheduling, Evaluation IPT, Human Resources, etc.).

## 9.3. Development Phase

The overall objective of the development phase is to effectively translate inputs from the analysis and design phases into courseware products. This phase begins after the proof of concept has been accepted and ends after the Navy has tested and accepted the training products.

Design plans influence the development process for a specific project; however, responsibilities and activities needed to define technical requirements (development input), documentation (development output), and all necessary development review and verification/validation activities also need to be defined.

Courseware development changes are identified, documented, reviewed, and approved by authorized personnel before their implementation and product configuration is maintained. The Government PM reviews data related to the development planning process, initiates appropriate corrective/preventive action and provides trend data and related recommendations to the ILE Implementation Team/Headquarters for review and action. The development phase takes outputs from the design phase, applies them throughout the development process, and then outputs to implementation.

As content is developed, it is forwarded to the PM for design verification and validation. If corrections or modifications are required, the content is returned to the development team for revision. The corrected content is returned to the PM for review until it is accepted. Once the content has been accepted, it is forwarded on to implementation.

The development phase consists of the tasks outlined in the left column in Table 4. During the development phase, the ILE Implementation Team and EIIIs are responsible for the performance of tasks, as outlined in the table.

**Table 4        Development Process Implementation Responsibility**

| Block | Level |
|---|---|
| Policy and Guidance | Level 1 |
| Review Design Deliverables | Level 2 |
| Develop Production Management Plan | Level 2 |
| Develop Content | Level 2 |
| Validate Curriculum Materials | Level 2 |
| Identify Corrections: Accept or Review | Level 2 |
| Command Review | Level 1 |

These events may be performed sequentially, some events may be skipped, or a different sequence may need to be used. Various factors affect the sequence or scope of the events such as service needs, scope or complexity of the training project, or other factors.

Table 5 provides recommended qualifications for ILE skill sets:

**Table 5          Recommended ILE Skill Set Qualifications**

| Team | Academic/Educational Qualifications | Skills/Abilities |
|---|---|---|
| Content | Degree or certification in specific content area assigned and/or Extensive knowledge of content area assigned and Extensive job-related/work experience in specific content area assigned | Analyze accuracy of content Identify currency of content as related to training need Analyze relevance of content as related to training need Analyze suitability of content for target audience Analyze completeness of content relative to training need |
| Design | Degree or certification in Curriculum or Instructional Design and Strong academic and research background and/or Extensive knowledge of curriculum development and Extensive job-related/work experience in curriculum/instructional design and/or teaching/training | Write/identify correct learning objectives Create/identify assessments at various levels of the Bloom's Taxonomy Analyze chapters/learning categories relative to training needs Analyze adult learning principles in chapters/learning modules Apply standard instructional design principles Analyze organization of content for learning effectiveness |
| Technical | Degree in Computer Science or Information Technology or relative Technical Certification(s) and/or Extensive knowledge of network operations, hardware and software installation, setup, configuration and usage and Extensive job-related/work experience in technology | Proficiency with various operating systems such as Windows 2000/20003 server, Exchange 2000/2003 server, UNIX and protocols Thorough knowledge and understanding of such things as Windows 2000/XP, Active Directory, browsers, firewalls, routers, hubs, switches Web Server Administration and Maintenance |
| Delivery Mode | Degree in Computer Science or Information Technology or relative Technical Certification(s) and/or Experience and knowledge in web development tools and web type products and designs and Extensive job-related/work experience in technology | Proficiency in standard navigation principles Proficiency in standard design principles Proficiency in web type products, designs, and tools such as ASP.NET, C#, XML, Web Services and Database Access, Layout Skills, Web User Interface Design, Web Graphic Design, Web Savvy, Creative Services, HTML, Data base Integration, etc. |

While reviewing design deliverables, the development team will learn as much as they can about the design of the lessons. Much of this information will be found in the documents developed during the design phase.

### 9.3.1. Develop Production Management Plan

During development planning, the PM shall determine:

 a. Steps to be used in the development phase
 b. Appropriate review, verification, and validation processes
 c. Lines of responsibility and authority

### 9.3.2. Develop Content

The Design Capability Solution, scoped during the design phase, is implemented during development.

A Government Furnished Information (GFI) / Government Furnished Equipment (GFE) review is conducted, the delivery method of the content is confirmed, and full-scale development commences.  At a suitable point in the process, systematic reviews shall be performed in accordance with planned arrangements to:

 a. Evaluate the ability of the results of design and development processes to meet requirements.
 b. Identify any problems and propose necessary actions.

Participants in such reviews shall include representatives of functions concerned with design and development.  Records of results of the reviews and any necessary actions shall be maintained.

The following list is representative of information that are provided as development outputs.

 • Developed content and associated instructional materials
 • Updated implementation plan
 • Validated instructional materials
 • Content performance validated in accordance with specifications
 • Content compliance verified in accordance with instructions, specifications, or policy

### 9.3.3. Content Validation

Validation performed in accordance with planned arrangements to ensure the resulting product meets requirements. Developed content is forwarded to the Government QA authority to test technical and performance specification compliance. The Government QA will:

 • Apply Configuration Management (CM) constraints
 • Determine Editorial compliance
   o Copyright Law
   o Chicago Style Manual

- o Section 508, USC
- o DID 81523B
- o MILPRF 28001
- o Security Requirements
- o SECNAVINST 5510.40
- o DoDINST 5200.40
- o DITSWG
- Conduct Safety Review of the Statement of Work (SOW)
- Determine Functional Compliance with the SOW
- Determine C3 Site Compliance to LMS/LCMS
- Test NMCI/IT21 Compliance through the FAM, EDS and Bench testing per SOP X.X
- DoD Instruction 5200.40
- DoD Manual 8510.1-M
- Determine ILE Compliance IAW with ILE Content Development Guidelines
- Test SCORM Compliance

Once validated, the content is then forwarded for implementation.

## 9.3.4. Change Control Board

In the event changes are required, the Lead Instructional Designer will forward recommended changes to the government PM, who in turn will convene a Change Board for Review to consider the recommended changes to the content or associated process.  If changes are approved, the PM will determine:

- If funds are available for the recommended changes.
- Whether the contractor, or developing entity, has the qualified staff to implement the changes.

If the changes are funded and can be accomplished, the PM will modify the contract and update the CM database to reflect the recommended changes. If the changes will affect the original design strategy of the courseware, the PM will determine whether the risk to the end product is acceptable. If the capabilities of the end product are not affected as a result of the changes, the modifications are made to the Production Management Plan. If the changes are not funded, the PM will commence the Risk Mitigation process (TBD).

## 9.4.  Implementation

With the establishment of the Navy ILE as the repository for all learning content, it is necessary to modify the ADDIE instructional design conceptual framework to incorporate procedures that address the integration of learning content into the ILE. Implementation/Integration is the fourth step in the ADDIE instructional design conceptual framework, and in the fourth quadrant of the Human Performance Systems Model (HPSM). The instructional product is delivered during implementation in a traditional classroom, a lab, computer (computer-based training) or via the web (e-learning). The purpose of this phase is the effective and efficient delivery of instruction.

Formative evaluation, an important process which occurs during and between the instructional design phases, is most important during implementation. During the early

phases of the project's conception, a formative evaluation methodology is developed. Application of the formative evaluation strategies occurs during the implementation phase; learners' validation of the instructional material is sought and may require design and/or content modification (Smith & Ragan, 1999). During implementation, Kirkpatrick's (1994) Levels I and II data are collected. In Kirkpatrick's evaluation model, Level I measures reaction or how well the participants liked the instructional content. Level II measures learning, specifically the degree to which the learners have achieved the learning objectives (increase/change in skills, knowledge, or attitude). The expected outputs, milestones, and deliverables of implementation ensure that the delivered product resides in the ILE.

## 9.4.1. Implementation Processes

Instructional content is delivered in the format for which it was developed (e.g., instructor-led, lab, computer-based, web-based, etc.).
- Assemble an integration team for the purpose of quality assurance and rapid response for issue resolution.
- Complete delivery preparations. This includes but is not limited to train the trainer/facilitator, systems, infrastructure, etc.
- Initiate formative evaluation activities for content accuracy and effectiveness.
- Begin delivery of the instructional content. Align student management issues to capitalize on the "Just in time, just for me" nature of ILE content.

Monitor results according to plan (Formative Evaluation).
- Ensure proper integration of ILE content (strategic and technical integration). Identify time critical issues on a consistent basis.
- Begin the formative evaluation plan developed during the design process. Evaluation data includes collecting feedback and/or observation data and student assessment data.
- Analyze these data to allow the project manager to make informed decisions about the efficiency and effectiveness of the instructional product.

Revise as necessary.
- Use the formative evaluation data (e.g., feedback, observation, assessment) to assess whether there are learning deltas that the instructional content does not fill.
- If such deltas do exist, the project manager, with the advice of implementation team members, can request revisions.
- Ensure content development/ version is captured.

Membership in this team includes Content Project Lead, ILE Systems Architect, Echelon III Project Managers, ILE Logistics, Science of Learning Practioner, Human Performance Technologist, Instructional Design Specialist, Content Subject Matter Expert, Evaluation Specialist, and Echelon III Customers.

Table 6 captures Implementation Team Requirements, and Figure 7 represents the Implementation Process Flow.

**Table 6        Implementation Team Requirements**

| Team Member | Role |
|---|---|
| Content Project Lead | Revision requirements |
| ILE Systems Architect | Systems integration |
| Echelon 3 Project Managers | Project oversight, revision as required |
| ILE Logistics | Student management |
| Science of Learning Practioner | Formative evaluation assistance |
| Human Performance Technologist | Performance analysis |
| Instructional Design Specialist | Formative evaluation assistance, revision requirements |
| Content Subject Matter Expert | Revision requirements |
| Evaluation Specialist | Formative and summative evaluation |
| Echelon 3 Customers | Project implementation, oversight, evaluation |
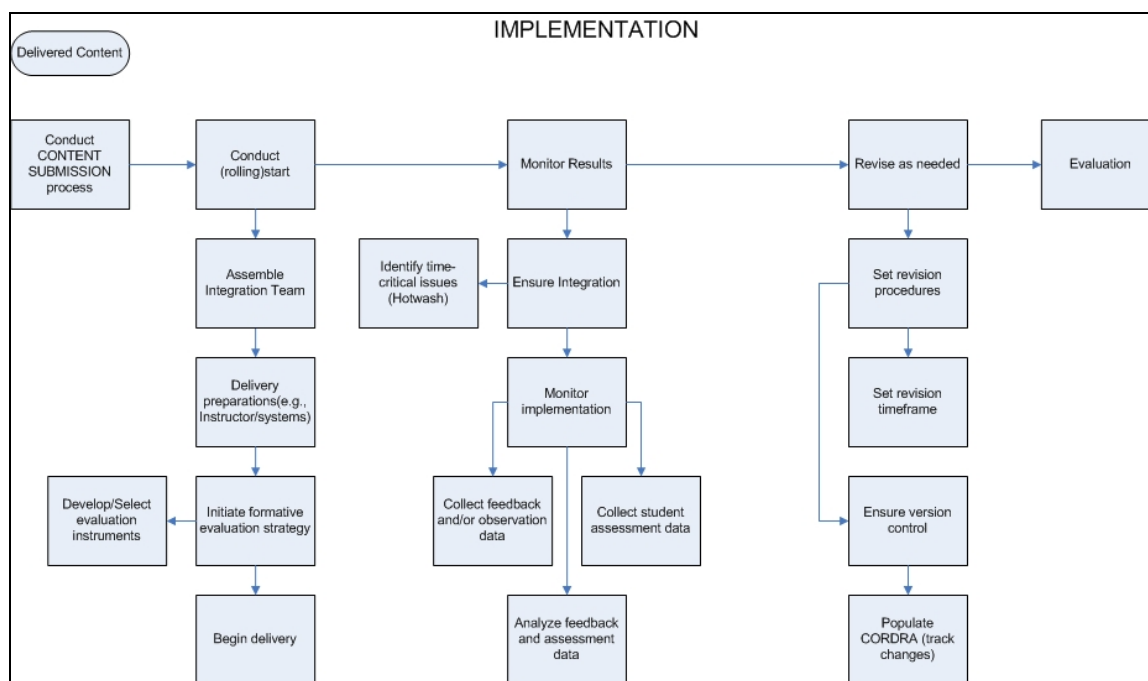


**Figure 7        Implementation Process Flow**

## 9.5.  Evaluation

The purpose of summative evaluation is to measure the effectiveness and efficiency of the instructional content and specifically the application of knowledge in the workplace. Evaluation should occur throughout the entire instructional design process - within phases, between phases, and after implementation. During the evaluation phase, the summative evaluation plan, formulated during the early phase of the project, is executed. Conduct summative evaluation after the instructional content has been in use for some time (three months, six months, a year) and periodically thereafter. Data collected during evaluation provides decision makers with information upon which to make a decision

about the instruction. In the summative evaluation phase, Kirkpatrick's Level III, IV, and V data can be collected. At a minimum, Level III data should be collected.

Level III measures whether the performance or behavior of the learner has changed after returning to the job. Surveys or interviews may be used to conduct this type of evaluation.

Level IV measures the impact on the organization that results from learners applying their newly learned knowledge or skills. Evaluation at this level requires defining metrics. Support for measuring Level IV is available from Mission Performance Analysis.

Level V measures return on investment (ROI). This simply determines the amount of money spent on course development compared to how much was realized by level four results (Benefits – Cost/Cost x 100%).

As in the evaluation component of the implementation phase, data from summative evaluation is a valuable resource with which to revise and improve the instructional content.

The evaluation phase has two major steps.
1. Measure/Evaluate against desired goals (Summative Evaluation).
   a. Implement the summative evaluation strategy (plan). This includes collecting data and analyzing the data. The member of the project team with expertise in data collection instrument development will oversee development of the instruments.
   b. Conduct the evaluation with the instruments and collect the data. The project team member with expertise should conduct the data analysis.
   c. Use the results of this analysis to make recommendations for changes/improvement to the instructional content and to capture lessons learned.
   d. Use the data analysis to prepare a Training Evaluation Report (DI-SESS-1524B).
2. Provide feedback to customer and other stakeholders.

Table 7 captures Evaluation Team Requirements, and Figure 8 represents the Evaluation Process Flow.

**Table 7        Captures Evaluation Team Requirements**

| Team Member | Role |
|---|---|
| ILE Logistics | Student management |
| Science of Learning Practitioner | Formative evaluation assistance |
| Human Performance Technologist | Performance analysis |
| Instructional Design Specialist | Formative evaluation assistance, revision requirements |
| Content Subject Matter Expert | Revision requirements |
| Evaluation Specialist | Formative and summative evaluation |
| ILE Systems Architect | Systems integration |
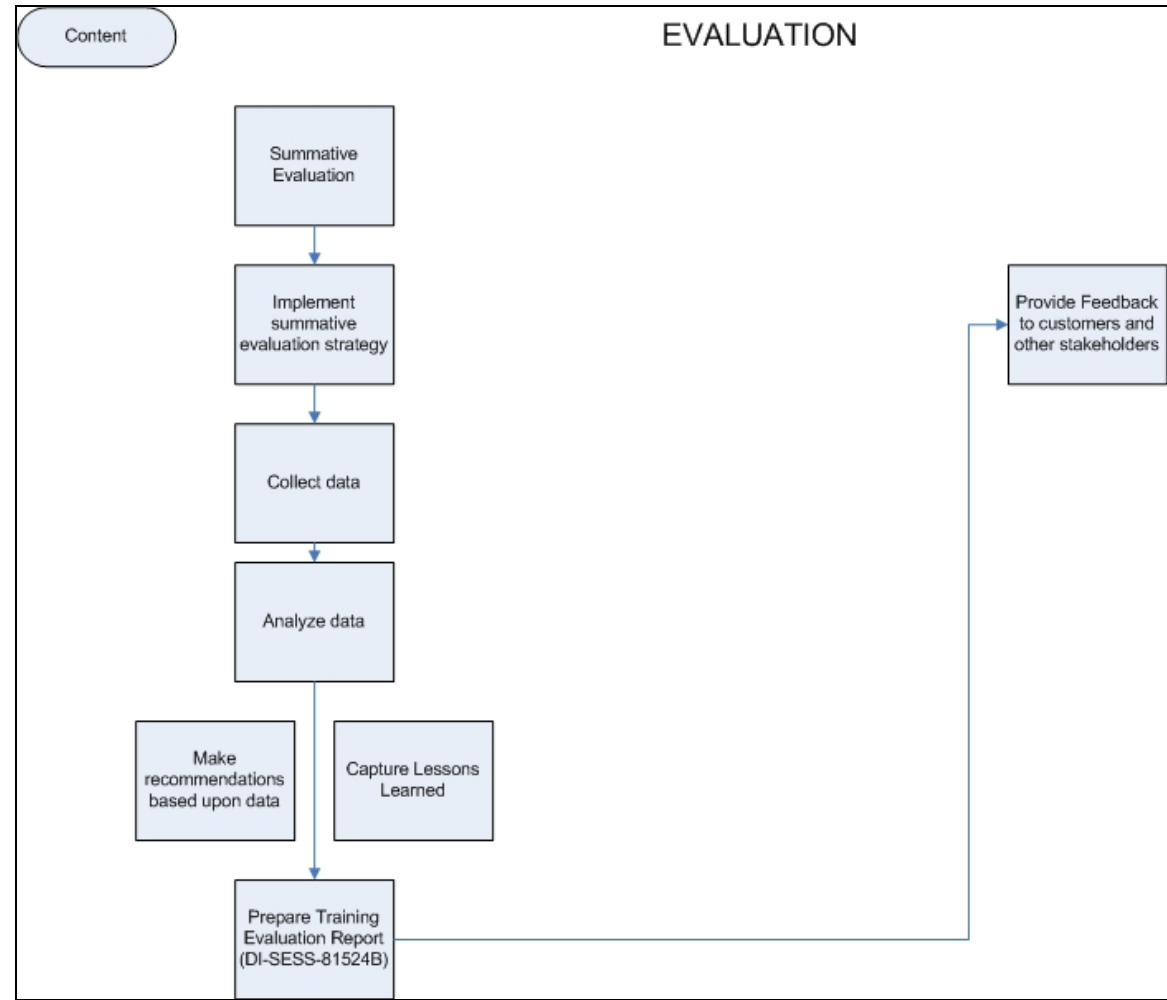
**Figure 8          Evaluation Process Flow**

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**Government Reference Documents**

The following documents are referenced or provided as guidance to more specifically define the design and development process.  The latest version of the document applies.

- *Course Prioritization Worksheet*
- *Navy ILE Content Design, Development, and Deployment, V1.2*
- *Learning Center Content Style Guide, V1.0*
- *ILEGUI1553-ISD-3 – ILE Interim Guidance for Navy Learning Objective Statements Specifications*
- *ILEGUI1553-ISD-1 – ILE Interim Guidance for Assessments*
- *DI-ILSS-81070 – Training Program Development and Management Plan*
- *DI-SESS-81517B – Training Situation Document*
- *DI-SESS-81518B – Instructional Performance Requirements Document*
- *DI-SESS-81519B – Instructional Media Requirements Document*
- *DI-SESS-81520B – Instructional Media Design Package*
- *DI-SESS-81521B – Training Program Structure Documen*
- *DI-SESS-81522B – Course Conduct Information Package*
- *DI-SESS-81523B – Training Conduct Support Document*
- *DI-SESS-81525B – Test Package*
- *DI-SESS-81526B – Instructional Media Package*
- *DI-SESS-81527B – Training System Support Document*
- *MIL-HDBK-29612-2A*
- *DoD Instruction 5200.40 - Department of Defense Information Technology Security Certification and Accreditation Process (DITSCAP)*
- *DoD Manual 8510.1-M – Department of Defense Information Technology Security Certification and Accreditation Process (DITSCAP) – Application Manual*
- *DoD Directive 8500.1 – Information Assurance (IA)*
- *CNO Msg 252250Z FEB 02 – NMCI Legacy Applications Transition Process*
- *CNO Msg 252230Z JUL 03 (N09) – Strategy for Managing Navy Applications and Databases within NMCI*
- *SECNAVINST 5239.3 – Department of the Navy Information Systems Security (INFOSEC) Program*
- *SECNAVINST 5000.36 – Department of the Navy Data Management and Interoperability*
- *NETCINST XXXX.X – Naval Education Training Center Instruction – Navy Integrated Learning Environment (ILE) Technical Specifications and Guidelines*
- *NETCINST XXXX.X – Naval Education Training Center Instruction - Navy Integrated Learning Environment (ILE) Guidance for NMCI/IT-21 Standards and Certification (NPDC)*

## Encl 1.  ILE Implementation Team

The power behind the ILE is the various teams executing their assigned responsibilities in support of the education and training mission requirements.

Leading the Revolution in Training charge is the ILE Implementation Team.  Its purpose is to provide the managerial, procedural, and business framework to analyze, define, develop and implement a learning environment consisting of the people, integrated systems and processes that provide the capability for My Learning Plan, My Learning Event, and delivered My Way.
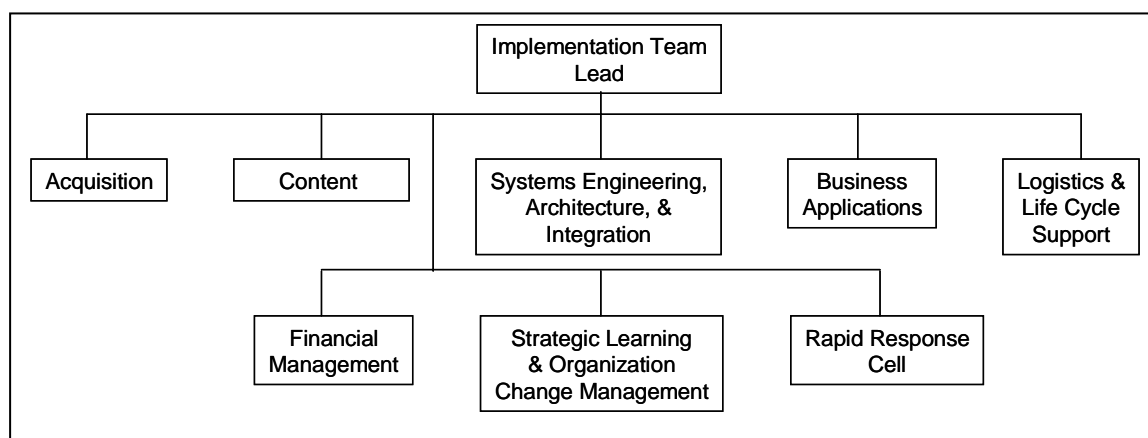


**Figure 9          ILE Implementation Team**

Following are short descriptions of the various ILE Implementation Team Leads.

The <u>Implementation Team Lead (ITL)</u> is the designated individual with responsibility for and authority to accomplish business objectives for ILE development, production, and sustainment to meet the end user's operational needs.  The ITL shall be accountable for credible cost, schedule, and performance reporting to the Commander, Naval Education and Training Command (CNETC).

<u>Acquisition Lead (A-Lead).</u>  The A-Lead will work with the procuring activities including FISC contracting offices, NAVAIR Orlando, NAVSEA, and other SYSCOMS to survey current contract vehicles and also plan, coordinate, assist, or manage any required acquisition projects.

<u>Content Lead (C-Lead).</u>  The C-Lead will be an acquisition professional who is assigned authority, responsibility, and accountability for the development, adequacy, and accuracy of all instructional design requirements, content specifications and standards, content contract requirements, quality assurance, and content business processes for the ILE.

<u>Systems Engineering, Architecture and Integration (S-Lead).</u>  The S-Lead is assigned authority, responsibility and accountability for the adequacy and accuracy of all architecture analysis, planning, systems engineering activities for the ILE from initial tasking to the completed delivery and acceptance of all ILE material, data and services.

Business Applications (B-Lead).  The B-Lead is assigned authority, responsibility, and accountability for the adequacy and accuracy of all business systems and software requirements for the ILE from initial tasking to the completed delivery and acceptance of all ILE material, data and services.

Logistics and Life Cycle Support (L-Lead).  The L-Lead is assigned authority, responsibility and accountability for the adequacy and accuracy of all Logistics requirements for the ILE from initial tasking to the completed delivery and acceptance of all ILE material, data and services.

Financial Management (F-Lead).  The F-Lead is responsible to provide advice and guidance and assist the ITL in monitoring team performance against cost goals.  The F-Lead is assigned authority, responsibility, and accountability for the adequacy and accuracy of all inputs to the ITL.

Strategic Learning and Organizational Change Management (X-Lead).  The X-Lead is responsible to develop a Change Management Plan and learning opportunities for Navy personnel to better understand how ILE enables Sea Warrior goals and objectives and supports the Navy's Human Capital Strategy.

Rapid Response Cell (R-Lead).  The R-Lead is responsible to provide quick response advice and guidance and asst the Team in answering critical questions.  The R-Lead will receive tasking from the ITL/DITL, and assemble the right skill mix on a case-by-case basis to respond.

**Encl 2.  Relationship of the four quadrants of the HPSM with the HPI.**

**Intervention Implementation**

Develop Interventions

**Intervention Planning**

Develop Implementation Strategy

Develop Plan of Action & Milestones

Secure Stakeholder Approval

**III. Develop Components**

Develop, Build, and Integrate Tools

**Evaluation**

Measure/Evaluate Against Desired Goals (Summative Evaluation)

Provide Feedback to Customer and Other Stakeholders

**Intervention Implementation**

Implement Interventions

Monitor Results According to Plan (Formative Evaluation)

Revise as Necessary

**IV. Execute & Measure**

Implement and Test Intervention; Evaluate "Product of Plan"